Spring 2021

CE 614-852: Underground Construction

Alan Slaughter

NJIT New Jersey's Science & Technology University

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CE 614 Underground Construction Spring 2021

Course Description: This course covers the various aspects of underground construction, including rock and soft ground tunnel construction, shaft construction, inspection and rehabilitation of existing structures, open cut construction, blasting and immersed tube tunnel construction.

Pre-requisite:

Canvas: Will be used for assignments, quizzes and additional communication.

Instructor: Alan R. Slaughter, P.E., P.P.

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Suggested Text: Introduction to Tunnel Construction, 2nd Edition
Authors: Chapman, Metje and Stark
Publisher: CRC Press; Paperback
ISBN-13: 978-1-4987-6624-1

Course Sections: CE 614-852

Meeting	Section Dates			Topic/*Assignment*
1	1/19/2021			Introduction Chapter 1
2	1/25/2021			Geotechnical and Shafts Chapter 2.2 to 2.3

3	2/1/2021			Geotechnical and Shafts Chapter 2.4 to 2.5
4	2/8/2021			Tunnel Analyses Chapter 3
5	2/15/2021			Groundwater Control & Open Cut Chapter 4
6	2/22/2021			Inspection of Tunnels
7	3/1/2021			Rock Excavation -Blasting Chapter 5.6
8	**3/8/2021**			**MIDTERM**
	3/14/2021			**School Vacation**
9	3/22/2021			Tunnel Boring Machine Chapter 5.5
10	3/29/2021			Earth Tunneling Shield Tunneling Methods Chapter 5.1 thru 5.4
11	4/5/2021			Tunnel Linings
12	4/12/2021			Immersed Tube Tunnels Microtunneling Chapter 5.7 thru 5.12
13	4/19/2021			Safety Chapter 6 Term paper due 4/20/2021
14	4/26/2021			Ground Movements and Monitoring Chapter 7
15	TO BE DETERMINED			FINAL

Grading Policy: Homework and Attendance 15%

Midterm 25%

Project 30%

Final 30%

Grading Scale:

A: give students 100-90
B+: 89-85

B: **84-80**
C+: **79-75**
C: **74-70**
D: **69-60**
F: **Below 60**

Attendance Policy: You are expected to read the material and perform the exercises in a timely manner and submit assignments on time . If assignments are late, the professor reserves the right to invoke a penalty on those assignments.

Withdrawals:

In order to insure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline will not be permitted unless extenuating circumstances (e.g., major family emergency or substantial medical difficulty) are documented. The course Professors and the Dean of Students are the principal points of contact for students considering withdrawals.

NJIT Honor Code:

The NJIT Honor Code will be upheld; any violations will be brought to the immediate attention of the Dean of Students. The Honor Code can be found at (http://www5.njit.edu/doss/policies/honorcode/index.php).

Assignment Policy: When homework is assigned, it will be due the following Monday. Any late homework may be subject to a reduction in grade for that homework

Syllabus Information:

The dates and topics of the syllabus are subject to change; however, students will be consulted with and must agree to any modifications or deviations from the syllabus throughout the course of the semester.

Email Policy: Please send to slaughte@njit.edu

Items Required for this Course: Book, calculator and computer materials

Outcomes Course Matrix –

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1:			
	1	3	Tests
Student Learning Outcome 2:			
	7	1	Term Paper
Student Learning Outcome 3:			

	4	2	Homework

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our Program Educational Objectives are reflected in the achievements of our recent alumni:

1. Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward safe, practical, sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
2. Professional Growth: Alumni will advance their technical and interpersonal skills through professional growth and development activities such a graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.
3. Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised 01/13/2021